

Conn., among eel-grass (*Zostera*), in 1874, I found several specimens in which the entire dorsal disk, with the contained viscera, had been lost and more or less restored, showing the various stages of the process. The dorsal disk of this species is soft and swollen, and is very easily detached. The arms are exceedingly long and slender, and subject to frequent restorations. In some of the examples in which a new disk was forming, the scars are still plainly visible on the bases of the arms, showing where the disk had been torn away, and its former size. In some of these the new disk, though perfect in form, had not grown to more than one third or one half the diameter of the old one; in others it was nearly completed. These small disks, connected with the full-sized arms and jaws of the adult, give such specimens a very peculiar appearance. At first I mistook some of these for the genuine young; but a more careful examination easily revealed their true nature.

In the same lot were specimens in which a portion of the edge of the disk, with one or two of the arms, had been destroyed and afterwards restored. In a few instances two arms had grown out in place of one.—*Amer. Journ. Sci.*, May 1882, p. 408.

On the Abyssal Malacological Fauna of the Mediterranean.

By M. FISCHER.

The demonstrated existence in the Mediterranean of a deep zone included between 250 and 3624 metres, and characterized by its constant temperature (about 55° F.), lends much interest to the enumeration of the Mollusca that live under these definite thermal conditions. But it is necessary to distinguish the species which inhabit the bottom from those whose shells have fallen from the surface after death. In most of the deep dredgings of the 'Travailleur' we found shells of pelagic Mollusca*, sometimes forming enormous accumulations, but quite incapable of furnishing any notion of the true abyssal fauna. On the other hand, the Gastropoda, the Scaphopoda, the Lamellibranchiata, and the Brachiopoda, in the adult state and with the shell intact, generally lived upon the bottom, whence they were collected by the dredge.

Nothing was known of the Gulf of Lyons below 350 metres. The most productive dredgings in Mollusca off these coasts during the expedition of the 'Travailleur' were at the stations No. 1 (555 metres), 9 (445 metres), and 5 (1685 metres); and the list that we have prepared includes more than sixty species †. Some of

* CEPHALOPODA: *Argonauta argo*. PTEROPODA: *Spirialis physoides*, *S. bulimoides*, *Protomedea rostralis*, *Hyalea tridentata*, *H. vaginellina*, *Cleodora lanceolata*, *C. cuspidata*, *Crescis spinifera*. HETEROPODA: *Curiana mediterranea*, *Atlanta Peronii*. GASTROPODA (larvæ): *Sinusigera*, sp.

† BRACHIOPODA: *Terebratulina vitrea*, *Terebratella septata*, *Terebratulina caput-serpentis*, *Megerlia truncata*. LAMELLIBRANCHIATA: *Lima elliptica*, *L. subauriculata*, *L. Sarsi*, *Pecten Brunei pes-lutree*, *P. Hoskinsi*, *P. fenestratus*, *Malletia cuneata*, *Leda messaniensis*, *L. striolata*, *Nucula sulcata*, *Arca lactea*, *A. tetragona*, *A. pectunculoides*, *Limopsis aurita*, *L. minuta*, *Daerydium vitreum*, *Astarte sulcata*, *A. triangularis*, *Venus*

them were indicated long ago in the fossil state in the Pliocene of Italy, such as *Terebratella septata*, *Leda messaniensis*, *Limopsis aurita*, *L. minuta*, *Pleurotoma Loprestiana*, *Columbella costulata*, *Rissoa subsoluta*, *Turbo romettensis*, *Trophon multilamellosus*, &c.; but they also live in the abysses of the Bay of Biscay and on the shores of Portugal.

Between the dredging 1 (555 metres) and the dredging 5 (1685 metres) there is no essential difference from a zoological point of view; the species of dredging 5 all occur in the bottom of dredging 1, but their number is restricted; we have only recognized about twenty*.

The dredgings 18 (2454 metres) and 17 (2660 metres) in the north of the Mediterranean, between Provence and Corsica, have also furnished us with Mollusca which existed at the depth of 555 metres—*Terebratula vitrea*, *Syndesmya longicallus*, *Xylophaga dorsalis*, *Nucula sulcata*, *Nassa Edwardsi*, *Dentalium agile*, &c.

We may conclude that between 445 and 2660 metres the deep-sea malacological fauna has the same zoological characters, but that the number of species gradually decreases with the depth. The equality of temperature has the effect of rendering the fauna almost uniform.

In the south of the Mediterranean the principal stations where Mollusca abound bear the numbers 26 (900 metres) and 28 (432 metres) along the Barbary coast, between Oran and Gibraltar. Here we collected about sixty species †; but some of these do not extend so far as the Gulf of Lyons. The remarkable forms are:—

multilamella, *Isocardia cor*, *Kellicella miliaris*, *Lucina spinifera*, *Neæra cuspidata*, *N. costellata*, *Xylophaga dorsalis*, *Syndesmya longicallus*, *Pholadomya Loveni*. SCAPHOPODA: *Siphonentalis quinquangularis*, *Cadulus tumulosus*, *Dentalium agile*. GASTROPODA: *Trophon multilamellosus*, *Chenopus Serresianus*, *Buccinum Humphreysianum*, *Nassa limata*, *N. Edwardsi*, *Columbella costulata*, *Marginella clandestina*, *Cerithium metaæra*, *Eulima stenostoma*, *E. distorta*, *Craspedotus Tinei*, *Turbo romettensis*, *Scissurella crispata*, *S. costata*, *Emarginula fissura*, *Odostomia unifasciata*, *Cromiscus gracilis*, *Rissoa abyssicola*, *R. subsoluta*, *Ringicula leptochila*, *Pleurotoma Loprestiana*, *Ilela tenella*, *Eulimella ventricosa*, *E. acicula*, *Achis Walleri*, *Cylichna conulus*, &c.

* *Terebratula vitrea*, *Lima elliptica*, *L. Sarsi*, *Mulletia cuneata*, *Leda messaniensis*, *L. striolata*, *Arca pectunculoides*, *Neæra costellata*, *Xylophaga dorsalis*, *Dentalium filum*, *Trophon multilamellosus*, *Ilela tenella*, &c.

† LAMELLIBRANCHIATA: *Pecten vitreus*, *Modiola lutea*, *Limopsis minuta*, *Arca diluvii*, *Nucula sulcata*, *N. ægeensis*, *Lucina borealis*, *L. spinifera*, *Axinus granulatus*, *A. ferruginosus*, *A. biplicatus*, *Astarte bipartita*, *Cardium minimum*, *C. papillosum*, *Venus multilamella*, *V. casina*, *Syndesmya longicallus*, *Neæra abbreviata*, *N. costellata*, *Poromya granulata*, *Saricava arctica*, *Saxicavilla plicata*. SCAPHOPODA: *Siphonentalis quinquangularis*. GASTROPODA: *Murex Spadæ*, *Nassa semistriata*, *Trophon multilamellosus*, *Chenopus Serresianus*, *Taranis Mörchi*, *Pleurotoma Loprestiana*, *Trochus gemmulutus*, *Zizyphinus Folini*, *Z. saturalis*, *Scissurella crispata*, *Natica fusca*, *Rissoa abyssicola*, *Eulima bilineata*, *Eulimella scillæ*, *E. acicula*, *Odostomia conoidea*, *Pyramidella minuscula*, *Actæon exilis*, *Cylichna nitidula*, *Tectura fulva*, *Calyptrea sinensis*, &c.

Modiola lutea, discovered in the Bay of Biscay between 677 and 1960 metres; *Taranis Mörchi*, a boreal species, abyssal in the Atlantic; *Trochus gemmulatus* and *Zizyphinus suturalis*, fossil in the Italian Pliocene, and found living in the Bay of Biscay; and *Tectura fulva*, an arctic mollusk.

Combining the Mollusca of all our deep dredgings (555–2660 metres) we obtain a total of about 120 species; but only thirty of these can be regarded as abyssal*. All the deep-sea species of the Mediterranean without exception occur also in the Atlantic Ocean. It therefore seems to be demonstrated that the Mediterranean receives its deep-sea fauna from the Atlantic, and that there has not been a centre of creation for it. It remains to be ascertained whether the fauna of the superior strata, characterized by a great number of species localized in the Mediterranean, is also derived from the Lusitanian fauna.

The abyssal forms of the Mediterranean have been dredged in the Atlantic generally at considerable depths. The Mediterranean therefore only contains the Mollusca which can bear a rather high temperature. The arctic forms fossilized in the glacial deposits of Sweden and the British Isles appear no longer to exist in the present Mediterranean, although they were abundant there during the newer Pliocene period (deposits of Ficarazzi). The temperature of the Mediterranean has consequently changed gradually; it is probable that it was not then constant, and that a communication with very cold seas brought arctic Mollusca into it. It would be interesting to ascertain whether, in the great depths of the eastern Mediterranean and of the Black Sea, there may not exist some survivors of the glacial fauna of the Pliocene of Ficarazzi.—*Comptes Rendus*, April 24, 1882, p. 1201.

A Zoological Station at Villafranca.

We have received from Dr. J. Barrois an intimation that the French government have recently decided upon establishing a new zoological station at Villafranca, of which the direction will be in his hands. The purpose for which it is specially founded is that of furnishing facilities for the study of the rich marine fauna of the locality, which yields in interest to no other in the Mediterranean, by the many naturalists who may be attracted to Villafranca by the charms of the place and its surroundings; and Dr. Barrois particularly expresses a hope that many English zoologists may be induced to avail themselves of the advantages thus offered to them at a much less distance from home than the older establishment at Naples. Dr. Barrois promises a particularly warm welcome to our countrymen.

* For example, *Terebratella septata*, *Lima Sarsi*, *Pecten Hoskinsi*, *Arinus granulatus*, *Malletia cuneata*, *Arca pectunculoides*, *Leda messanensis*, *L. striolata*, *Limopsis aurita*, *L. minuta*, *Pholadomya Loveni*, *Modiola lutea*, *Dacrydium vitreum*, *Dentalium agile*, *Cadulus tumidosus*, *Taranis Mörchi*, *Helia tenella*, *Pyramidella minuscula*, *Pleurotoma Loprestiana*, *Tectura fulva*, *Columbella costulata*, *Turbo romettensis*, *Trochus gemmulatus*, *Rissoa subsoluta*, *Eulima stenostoma*, *Craspedotus Tinei*, *Trophon multilamellosus*, &c.